

What is claimed is:

1. A process of preparing hydrogen through thermochemical decomposition of water, wherein coal powders are caused to react with water in the presence of CaO under a condition of temperature in a range of 600°C to 800°C substantially without an oxidizing agent added thereto, thereby reducing water to form hydrogen, said process comprising the steps of rendering the coal powders and CaO into impalpable powders to form mixed impalpable powders, feeding steam generated from a steam generator and the mixed impalpable powders to a fluidized bed of a main reactor, and implementing thermochemical decomposition of water in the main reactor by causing the mixed impalpable powders of the coal powders and CaO to undergo grain growth in the fluidized bed while adjusting a steam partial pressure in the main reactor so as to be suited for a condition enabling CaO to form  $\text{Ca(OH)}_2$ .

2. A process of preparing hydrogen through thermochemical decomposition of water according to claim 1, wherein the steam partial pressure in the fluidized bed is at not less than 3 atm at 600°C and is at not less than 40 atm at 800°C.

3. A process of preparing hydrogen through thermochemical decomposition of water according to claim 1, wherein grain size of the mixed impalpable powders is in a range of 0.005 to 0.05 mm, and the grain size after the grain growth is in a range of 0.05 to 0.35 mm.

4. A process of preparing hydrogen through thermochemical decomposition of water according to any of claims 1 to 3, wherein the main reactor is a fluidized bed reactor, and the outer wall of the main reactor is cooled to not higher than 600°C.